REMARKS

Claims 1-19 are all the claims presently pending in the application. By this amendment, claim 8 is amended, claims 10-19 are canceled without prejudice or disclaimer, and new claims 20-24 are added to more particularly define the invention. The amendments introduce no new matter.

It is noted that the claim amendments, if any, are made only to assure grammatical and idiomatic English and improved form under United States practice, and are not made to distinguish the invention over the prior art or narrow the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claim 8 stands objected to for informalities. Claim 8 is amended in accordance with the Examiner's suggestion. Applicant respectfully requests the Examiner reconsider and withdraw the objection to claim 8.

Claims 1-3, 5-11, and 14-19 stand rejected under 35 U.S.C. §102(e) over Iselt (U.S. 6,917,582). Claims 4 and 12-13 stand rejected under 35 U.S.C. §103(a) over Iselt in view of Zhang (U.S. Patent Application Publication 2003/0016148). Claims 10-19 stand further rejected under 35 U.S.C. §112, first paragraph.

These rejections are respectfully traversed in the following discussion.

THE CLAIMED INVENTION

The claimed invention is directed to an information processing apparatus. A first and

second processing means perform the same process in synchronism with each other. Adjustment means adjust orders of output data from the first and second information processing means so as to correspond to each other to discriminate whether or not the output data coincide with each other. A re-construction means re-constructs a plurality of output data of the second information processing means, based on a plurality of output data of the first information processing means. A comparison means compares the output data of the first information processing means and the output data of the second information processing means with each other.

The information processing apparatus can thus discriminate, even when the orders of output data of a plurality of CPU modules differ from each other, whether or not the operations of the CPU modules coincide with each other.

In a conventional information processing apparatus for use with a fault-tolerant system, even if each of the plurality of processors normally operates, an interruption timing for interruption handling of one of the processors sometimes displaces output of one processor from that of the other processor, thereby making the timings or the orders of output data of the processors different. If the order of the output data of one of the processors changes, then the output data of the processors become different from each other at a certain point of time. Therefore, the lack of coincidence of the output data of the processors is detected in error, as described on pages 1-2 of the specification.

The claimed invention, on the other hand, provides an information processing apparatus which can discriminate, even if the orders of output data differ from each other or if any of output data is interrupted, whether or not the operations of the CPU modules

coincide with each other.

THE §112 REJECTIONS

Claims 10-19 stand rejected under 35 U.S.C. §112, first paragraph. Although Applicant disagrees with the Examiner's assertion that claims 10-19 are not disclosed in the specification, Applicant cancels claims 10-19 without prejudice or disclaimer in an effort to expedite prosecution. Thus, the rejections of claims 10-19 under 35 U.S.C. §112, first paragraph, are moot.

THE PRIOR ART REJECTIONS

The Iselt Reference

Claims 1-3, 5-11, and 14-19 stand rejected under 35 U.S.C. §102(e) over Iselt. The Examiner alleges that Iselt teaches the claimed invention. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Iselt. Thus, Applicant respectfully traverses this rejection.

With regard to independent claim 1, Iselt fails to disclose or suggest at least "An information processing apparatus, comprising: first and second information processing means for performing a same process in synchronism with each other; and adjustment means for adjusting orders of output data from said first and second information processing means so as to correspond to each other to discriminate whether or not the output data coincide with each other," as recited in the claim.

The Examiner alleges that Iselt discloses, "first and second information processing means for performing the same process in synchronism with each other (ATM cell stream is

split into two redundant data streams that are routed via different paths, fig. 1, col. 3 lines 5-10)." Office Action, p. 4

However, Iselt fails to disclose or suggest first and second information processing means, as recited in the claim, and as further defined in new claims 22-24. Such a feature is integral to at least these claims.

Instead, Iselt discloses only two data streams. "*FIG. 1 shows a device on which the inventive method is run. An ATM cell stream is split into two redundant data streams that are routed via different paths W_0, W_1 separately and independently of one another.*" Iselt, col. 3, lines 7-10.

Further, the two data streams of Iselt are split from a single data stream, as described above. Iselt is concerned with ensuring the integrity of a single source data stream. Thus, coincidence of the data streams to W_0 and W_1 provides no indication whatsoever whether the data is correctly calculated. An error in the original ATM cell stream of Iselt would result in identical errors in both redundant data streams, even when said data streams are received without additional error.

The present invention, in sharp contrast, requires at least first and second information processing means, such that the output of one can corroborate the output of the other.

The Examiner further alleges that Iselt discloses, "*adjustment means (merge the data streams, fig. 1, col. 3 lines 5-20) for adjusting orders of output data from said first and second information processing means so as to correspond to each other to discriminate whether or not the output data coincide with each other (fig. 3b-3c, comparison of the two ATM cells leads to an inequality in the pair-by-pair comparison during failure recognition*

phase, col. 4 lines 43-57 and col. 5 lines 1-16)." Office Action, p. 4.

However, Iselt fails to disclose or suggest at least adjustment means for adjusting orders of output data from said first and second information processing means, as recited in the claim.

Instead, Iselt discloses only comparing the redundant data streams, and deleting cells that do not match between the streams; the orders of the output data are unaffected. Iselt outputs ATM cells only in the original order in which they are received; later cells input are always output after, never before, earlier cells. "*The ATM cells are compared to one another in a comparator V. These procedures are controlled and monitored by a controller ST. Based on the criterion of the inventive method, the ATM cells are taken from the buffer memories and supplied to further devices via a path W.*" Iselt, col. 3, lines 13-20. "*Beginning with the confirmation phase and during the following failure recognition phase, the respectively oldest ATM cell of the leading data stream is deleted from the buffer memory given a correct pair-by-pair comparison.*" Iselt, col. 4, lines 27-31. "*After eliminating a failure, the data stream that is again available is synchronized with the existing one.*" Iselt, col. 6, lines 15-16.

Hence, turning to the clear language of the claims, in Iselt there is no teaching or suggestion of "first and second information processing means for performing a same process in synchronism with each other; and adjustment means for adjusting orders of output data from said first and second information processing means so as to correspond to each other to discriminate whether or not the output data coincide with each other," as required by independent claim 1.

Claims 2-4 and 20-24 depend from independent claim 1, and inherit all features and limitations thereof. Applicants submit that claims 2-4 and 20-24 are patentable for at least this reason, as well as for the additional features they recite.

With further regard to claim 2, Iselt fails to disclose or suggest each element of the claim, in particular, "first information processing means" and "second information processing means," as discussed above.

With further regard to dependant claim 3, Iselt fails to disclose or suggest at least "the output data adjusted in order so as to correspond to each other," as recited in the claim.

The Examiner alleges that Iselt discloses, "*the output data adjusted in order so as to correspond to each other to discriminate whether or not the output data coincide with each other (fig. 3b-3c, comparison of the two ATM cells leads to an inequality in the pair-by-pair comparison during failure recognition phase, col. 4 lines 43-57 and col. 5 lines 1-16).*" Office Action, p. 5.

However, Iselt figures 3a-3d disclose only comparisons that are made to detect various discrepancies in the data streams. Faulty ATM cells may be removed from the data stream, but the order of the data streams is not adjusted.

> "*It is assumed in FIG. 3b that an ATM cell of the trailing data stream D_0 has been lost. In this case, the direct comparison of the two ATM cells leads to an inequality. Subsequently, a comparison with the older ATM cell of the leading data stream D_1 is then implemented. When the comparison of the current ATM cell of the trailing data stream D_0 to the second oldest ATM cell of the leading data stream D_1 leads to an agreement, then it is assumed that an ATM cell was missing in the trailing data stream D_0. The corresponding ATM cell of the leading data stream D_1 is then removed from the buffer memory and the failure recognition phase is continued.*
>
> *It is assumed in FIG. 3c that an ATM cell of the leading data stream D_1 has been lost. In this case, the direct comparison of the two first ATM cells as well as of the first to the following leads to an inequality. When the comparison of the current ATM cells*

> *of the following ATM cell of the trailing data stream D_0 to the oldest ATM cell of the leading data stream D_1 leads to no agreement, then it is assumed that an ATM cell had been missing in the leading data stream D_1. The corresponding ATM cell of the trailing data stream D_0 is then overlooked and the failure recognition phase is continued.*
>
> *It is assumed in FIG. 3d that the two ATM cells of the leading data stream D_1 and of the trailing data stream D_0 have been lost. When the comparison of the pair of ATM cells following the current comparison pair leads to agreement, then it is assumed that one of the ATM cells of the current pair is faulty. Both comparison pairs (current, faulty pair and following, correct pair) are then removed from the buffer memory and the failure recognition phase is continued.*"

Iselt, col. 4, line 52 – col. 5, line 16.

With regard to independent claim 5, Iselt fails to disclose or suggest at least "first and second information processing means for performing a same process in synchronism with each other; and adjustment means including re-construction means for re-constructing a plurality of output data of said second information processing means based on a plurality of output data of said first information processing means; and comparison means for comparing with each other the output data of said first information processing means and the output data of said second information processing means re-constructed by said re-construction means," as recited in the claim.

Iselt fails to disclose or suggest at least first and second information processing means, as discussed above.

Further, Iselt fails to disclose or suggest re-construction means for re-constructing a plurality of output data of said second information processing means.

The Examiner alleges that Iselt discloses, "adjustment means including re-construction means for re-constructing a plurality of output data of said second information processing means based on a plurality of output data of said first information processing

means (merge the data streams, fig. 1, col. 3, lines 5-20)." Office Action, p. 5.

Instead, Iselt discloses only, "*An ATM cell stream is split into two redundant data streams that are routed via different paths W_0, W_1 separately and independently of one another. The data streams are turn merged in a device according to FIG. 1.*" Iselt, col. 3, lines 8-11. Iselt discloses only comparison and output of ATM cells as received. Iselt fails to disclose or suggest re-construction of any data.

Claims 6-7 depend from claim 5, and inherit all features and limitations thereof. Applicants submit that claims 6-7 are patentable for at least this reason, as well as for the additional features they recite.

With further regard to claim 6, Iselt fails to disclose or suggest wherein "said re-construction means changes an order of the output data," as discussed above with regard to claim 1.

With further regard to claim 7, Iselt fails to disclose or suggest wherein "said re-construction means divides and re-couples the output data of said second information processing means stored in said second storage means based on the output data of said first information processing means stored in said first storage means," as recited in the claim.

The Examiner alleges that Iselt discloses such a feature, "*(replacing the faulty/missing ATM cell with a corresponding ATM cell taken from an intact, other redundant sub-system, col. 1 lines 52-61).*" Office Action, p. 6.

The Examiner correctly refers to Iselt as replacing, not dividing and re-coupling, output data.

Further, Iselt discloses only replacing faulty/missing data – that is, data that has

already been compared between the data streams. The present invention, in sharp contrast, divides and re-couples data in the re-construction means of the adjustment means, prior to comparison in the comparison means. "Comparison means for comparing with each other the output data ... re-constructed by said reconstruction means." See: claim 5.

With regard to independent claim 8, Iselt fails to disclose or suggest at least "An information processing apparatus, comprising: first and second information processing means for performing a same process in synchronism with each other; and adjustment means for selecting one of a plurality of data of a second output of said second information processing means which data is determined to correspond to one of data of a plurality of data of a first output of said first information processing means to detect whether or not the data of the first and second outputs coincide with each other," as recited in the claim.

Iselt fails to disclose or suggest first and second information processing means, as discussed above.

Further, Iselt fails to disclose or suggest both "selecting one of a plurality of data of a second output ... which data is determined to correspond to one of data of a plurality of data of a first output," and "to detect whether or not the data of the first and second outputs coincide with each other," as recited in the claim.

Instead, as discussed above, Iselt discloses only comparing the data streams to determine whether the ATM cells match each other. Iselt fails to distinguish between determining which data correspond to each other, and separately comparing the contents to determine whether the corresponding outputs coincide in their data values. Such a feature is necessary to compare the data outputs of the first and second information processing means.

Instead, Iselt discloses only a failure – that is, detecting whether two ATM cells in the data streams are not identical. Iselt is unable to distinguish a case wherein the two data streams contain data that correspond (that is, the correct two cells are being compared) but differ in their data, from a case wherein one or more data of a data stream are lost or damaged.

The present invention, in contrast, provides a check on the first and second information processing means by comparing the corresponding data outputs of the first and second information processing means. Iselt provides no ability to check on the first and second information processing means; any error in the original data stream would be reproduced and not detected when split into two independent data streams.

Claim 9 depends from claim 8, and inherits all features and limitations thereof. Applicants submit that claim 9 is patentable for at least this reason, as well as for the additional features it recites.

Therefore, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1-9.

The Zhang Reference

Claim 4 stands rejected under 35 U.S.C. §103(a) over Iselt in view of Zhang. Applicants respectfully traverse this rejection.

Claim 4 depends from patentable claims 1 and 2, as discussed above, and inherits all features and limitations thereof. Applicants submit that claim 4 is patentable for at least this reason, as well as for the additional subject matter it recites.

Further, even assuming, *arguendo*, that Iselt in view of Zhang disclosed all features of

the claim, no reference is cited which teaches or suggests combining Zhang with Iselt in this manner.

Further, the motivation alleged by the Examiner to combine Zhang with Iselt is only, "*because it would established telecommunication standards require the transceiver to perform various functions, including data monitoring and error correction (paragraph 0043).*" Office Action, p. 12. However, the Examiner has already argued that Iselt provides data monitoring (compares the independent data streams) and error correction (replacing the faulty/missing ATM cell with a corresponding ATM cell taken from an intact, other redundant sub-system). Thus, Iselt does not lack the qualities which the Examiner alleges provide a motivation to combine with Zhang.

Therefore, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 4.

CONCLUSION

In view of the foregoing, Applicant submits that claims 1-9 and 20-24, all the claims presently pending in the application, are patentably distinct over the prior art of record and are allowable, and that the application is in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned attorney at the local telephone number listed below to discuss any other changes deemed necessary for allowance in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. The Commissioner is authorized to charge any deficiency in fees, including extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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